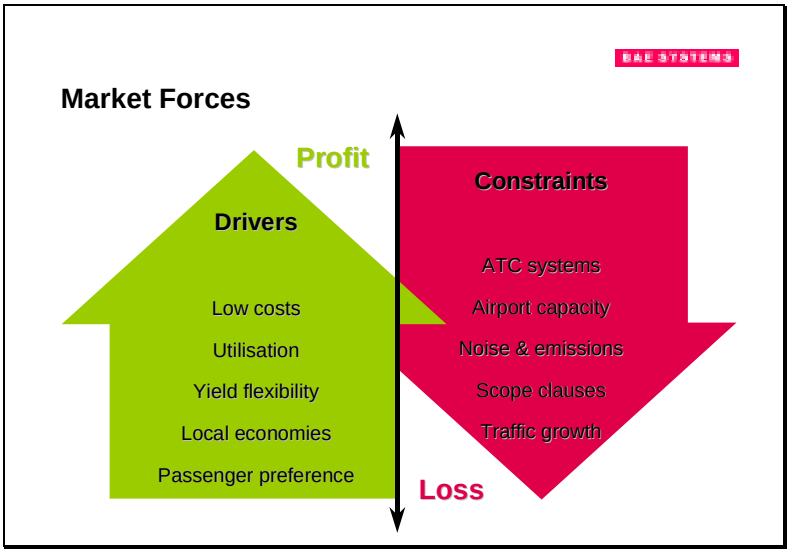
Slide 1

Slide 2

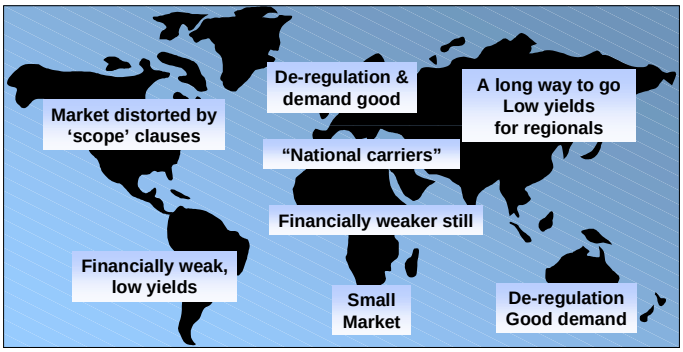

BAE SYSTEMS
Regional Market Overview
A Review
Market Realities
Meeting the Need

Slide 3

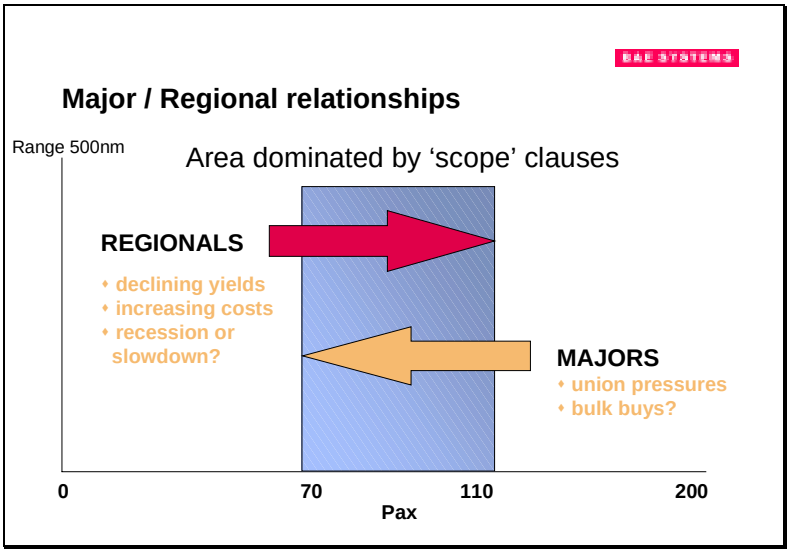

BAE SYSTEMS
Market Forces
Profit
Drivers
Low costs
Utilisation
Yield flexibility
Local economies
Passenger preference
Constraints
ATC systems
Airport capacity
Noise & emissions
Scope clauses
Traffic growth
Loss

Slide 4

## Regional Market Realities



Slide 5


BAE SYSTEMS
Major / Regional relationships
Range 500nm
Area dominated by 'scope' clauses
REGIONALS
• declining yields
• increasing costs
• recession or slowdown?
MAJORS
• union pressures
• bulk buys?
0
70
110
200
Pax

Slide 6

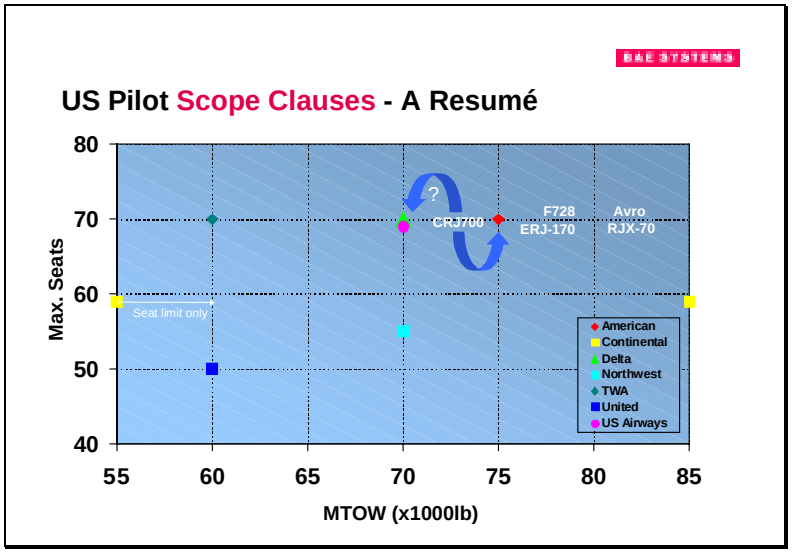
## US Pilot Scope Clauses - A Resumé

| Airline | Max Seats | Max Weight | Permitted # of Jets |
|---|---|---|---|
| American | 70 | 75,000 lb | 67 (linked to AA fleet) |
| Continental | 59 | No restriction | No restrictions |
| Delta | 70 | 70,000 lb | No restrictions* |
| Northwest | 55 | 70,000 lb | Linked to narrowbodies* |
| United | 50 | 60,000 lb | 65 (linked to UA fleet)* |
| US Airways | 69 | 70,000 lb | Up to 9% of US fleet |

* BAe 146 or Avro RJ85 are exempt

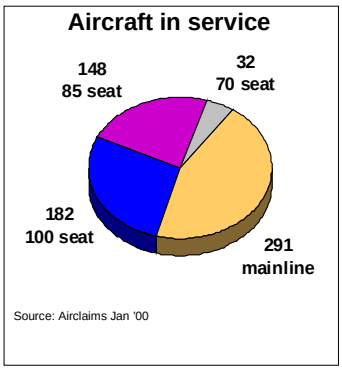
**A Major Distortion of "FREE MARKET" Dynamics - but REALITY**

Slide 7


BAE SYSTEMS
US Pilot Scope Clauses - A Resumé
Max. Seats
80
70
60
50
40
55
60
65
70
75
80
85
MTOW (x1000lb)
?
CRJ700
F728
ERJ-170
Avro
RJX-70
Seat limit only
American
Continental
Delta
Northwest
TWA
United
US Airways

Slide 8

## 70-120 seat jets in Europe




- 55% of fleet is regional
- 70 seaters are niche
- Core regional market is 85-100 seats
- >60% of regional fleet is Avro RJ / BAe 146.
- Market drivers:
  - comfort
  - turnaround capability
  - low costs (Eurocontrol, landing/navigation)

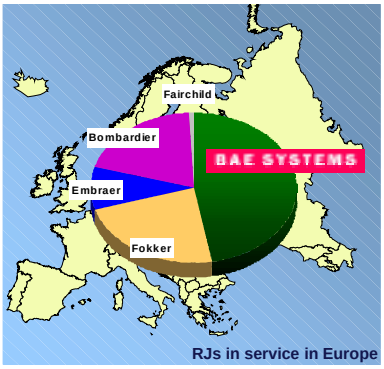
Slide 9

BAE SYSTEMS

## Europe - Market

- European operators 32
- 146/RJ fleet 230
- No of city pairs flown 600
- ASKs flown by 146/RJ 20%
- Available capacity 30%

**Every 40 seconds**
a BAe 146 or Avro RJ
takes-off or lands
somewhere in Europe



RJs in service in Europe

**BAe 146 and Avro RJ - Hardly a Niche Aircraft !**

Slide 10

BAE SYSTEMS

## Market Trends - Europe

- RJ fleet growing
  - ERA 75+ pax jets: 14% of fleet in 1992
    33% in 1998
- Market for 70 seaters still a niche
- User charges / labour costs / flexibility force trend towards regional operations e.g.
  - Sabena to DAT
  - Swissair to Crossair
  - Air France to franchisees
  - British A/W to Cityflyer, BRA, Brymon etc.
- Mainline jets B717 & A318 are 7-12t heavier
  - cost $300-850k more p.a. than RJs
- 'Scope' clause is less of an influence than USA

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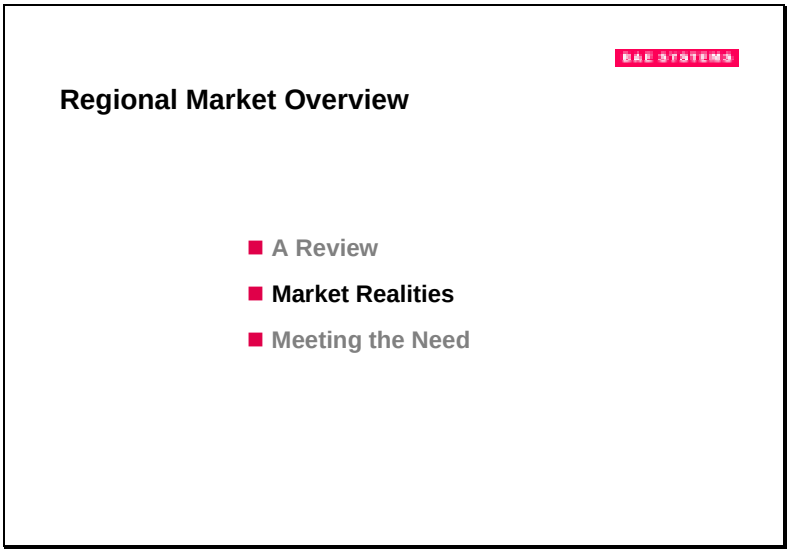
BAE SYSTEMS
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## Market forecasts vs viability

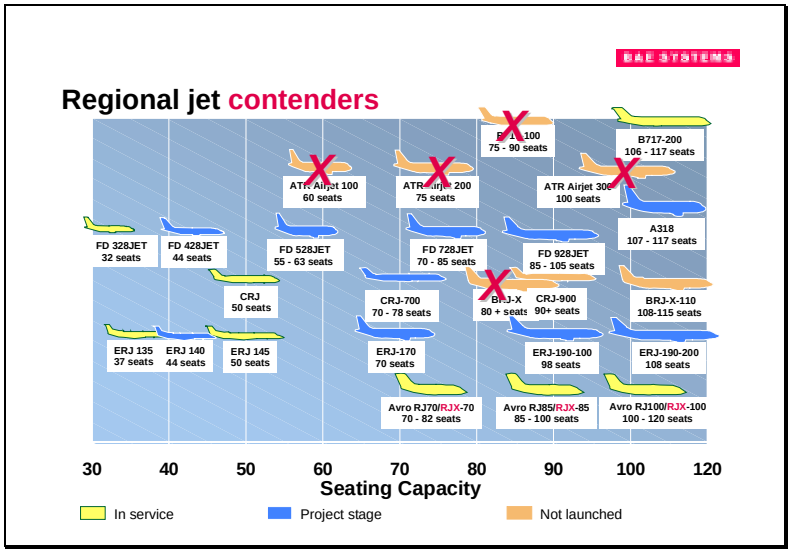
- Manufacturer's world forecasts - 70 to 100 seat RJ market

  **Average forecast 120* a/c per year**

- BUT these do not adequately address scope clause issues
- USA (~50% of forecast) limited by 'de facto' scope clause
  - 100+ seats in majors, 50 pax RJ in regionals
- EU represents around 30% (approx 35 a/c p.a.)
- Forecasts must better assess 'total' market
  - trades-in
  - recession / slowdown
  - micro-dynamics

*FD, Brad, AIRjet for next 20 years

Slide 13


BAE SYSTEMS
Regional jet contenders
ATR Airjet 100
60 seats
ATR Airjet 200
75 seats
ATR Airjet 300
100 seats
B717-200
106 - 117 seats
FD 328JET
32 seats
FD 428JET
44 seats
FD 528JET
55 - 63 seats
FD 728JET
70 - 85 seats
FD 928JET
85 - 105 seats
A318
107 - 117 seats
CRJ
50 seats
CRJ-700
70 - 78 seats
BRJ-X
80 + seats
CRJ-900
90+ seats
BRJ-X-110
108-115 seats
ERJ 135
37 seats
ERJ 140
44 seats
ERJ 145
50 seats
ERJ-170
70 seats
ERJ-190-100
98 seats
ERJ-190-200
108 seats
Avro RJ70/RJX-70
70 - 82 seats
Avro RJ85/RJX-85
85 - 100 seats
Avro RJ100/RJX-100
100 - 120 seats
30
40
50
60
70
80
90
100
120
Seating Capacity
In service
Project stage
Not launched

Slide 14

## Bandwagon Gets Bigger

- Bombardier Continental Jet for regional use (NW?)
- Earl Robinson & Alliance Aircraft (US?)
- Fairchild 1128JET (CLH?)

What next ?

**The Message Isn't Getting Through!**

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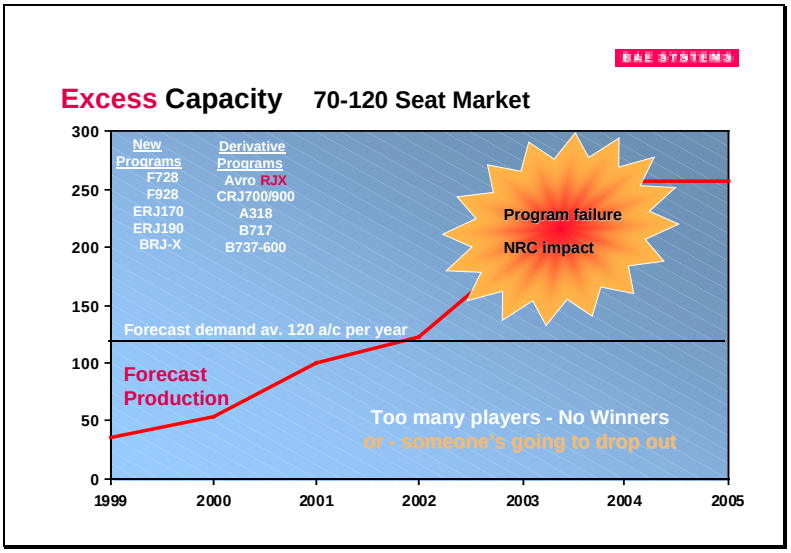
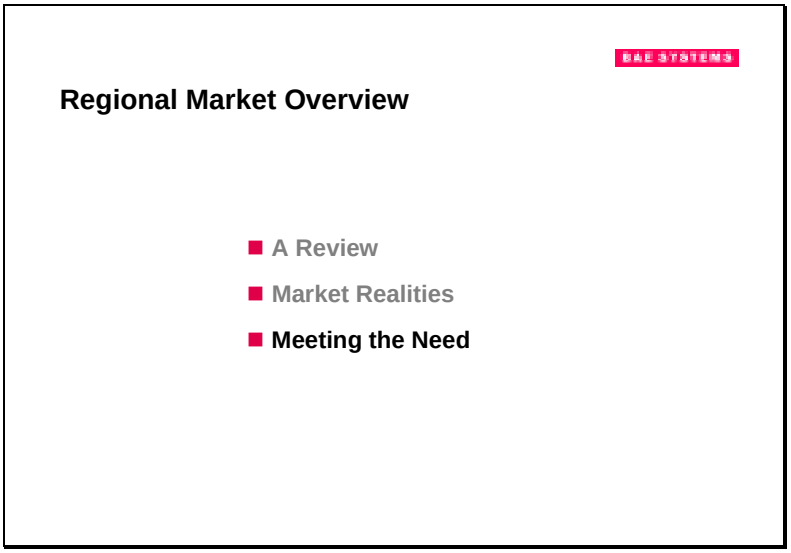

BAE SYSTEMS
Excess Capacity
70-120 Seat Market
New Programs
F728
F928
ERJ170
ERJ190
BRJ-X
Derivative Programs
Avro RJX
CRJ700/900
A318
B717
B737-600
Program failure
NRC impact
Forecast demand av. 120 a/c per year
Forecast Production
Too many players - No Winners
or - someone's going to drop out
300
250
200
150
100
50
0
1999
2000
2001
2002
2003
2004
2005

Slide 16


BAE SYSTEMS
Regional Market Overview
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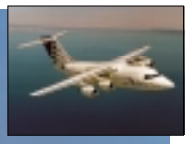
## The Avro RJ Family

BAE SYSTEMS

- RJ70 seats 70 to 82 at five and six abreast



- RJ85 seats 85 to 100 at five and six abreast


- RJ100 seats 100 to over 120 passengers

**The only REAL family with common engines and airframe**

Slide 18

BAE SYSTEMS

## Cabin versatility

FIRST CLASS
4-abreast
53" double seats

17" between seat arms

19" between seat arms

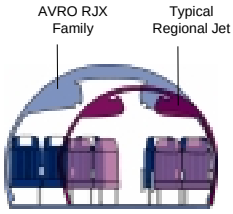
Wide cabin and mixed-class capability maximise revenue

Slide 19

BAE SYSTEMS

## Wide cabin

### Regional Jet Cross Sections




| | Seats abreast | In-arm width ins. | Aisle width ins. |
|---|---|---|---|
| Avro RJX family | 5 | 19 | 21 |
| Airbus A320 family | 6 | 18 | 19 |
| Boeing 717 5 | 18 | 19 | |
| Boeing 737 family | 6 | 17 | 20 |
| Avro RJX family | 6 | 17 | 16 |
| Bombardier CRJ700 | 4 | 17 | 16 |
| Embraer ERJ145 family | 3 | 17 | 17 |

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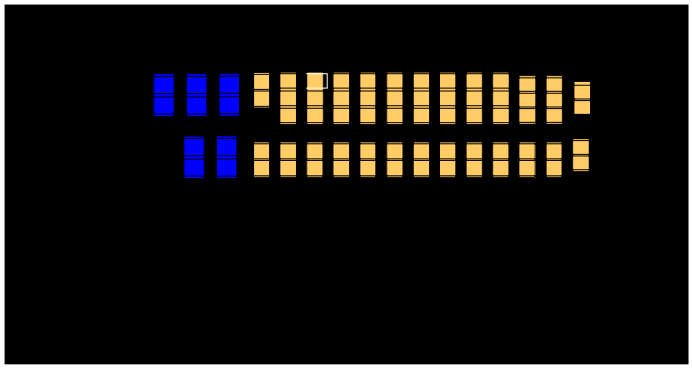
BAE SYSTEMS

## RJX-85 mixed class layout



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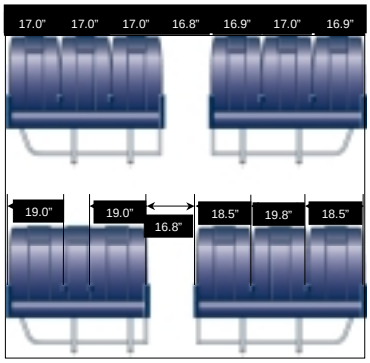
BAE SYSTEMS

## Seamless Service

Slide 22

## Convertible seat option




6-abreast economy

5-abreast business class

Slide 23

## New Design or Development?

| | New design | Development |
|---|---|---|
| Latest engine technology | ✓ ? | ✓ |
| Latest airframe technology | ✓ | X |
| Low technical risk | X | ✓ |
| Low program risk | X | ✓ |
| Early entry-into-service | X | ✓ |
| Proven maintainability & reliability | X | ✓ |

**Does $1.5bn warrant cost of improved airframe?**

Slide 24

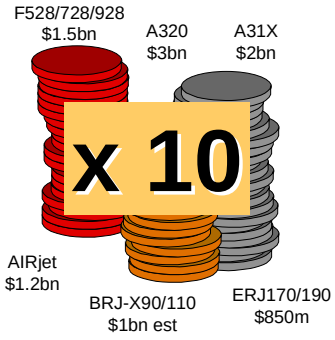
## Economic Benefits of New Designs

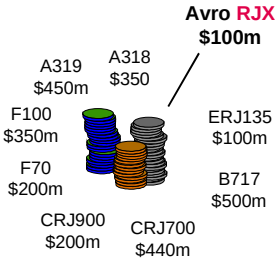
- What revenue advantages do new designs offer?
- No improvements in
  - Cabin
  - Airfield performance
  - Payload
- Speed and range improved BUT
  - operating environment restricts advantage
  - weight-related charges high
  - where's the market?

**New designs take step back at expense of speed and range**

Slide 25

## New vs Derivative




**New "clean-sheet" designs** **Derivative approach**

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## Avro RJX

- 10-15% fuel burn reduction
- 20% maintenance cost improvement
- 500 lb. empty weight reduction
- Lower noise and emission levels
- Up to 17% range improvement
- A typical 2 tonne reduction in mission weight for lower costs

**The Avro RJX is a major development of the highly successful Avro RJ program and is scheduled to enter service in mid-2001.**

Slide 27

## Avro RJX Program Update

- Authority to Offer
- Wind Tunnel Testing Completed
- Flight Manual performance defined
- Performance guarantees available
- Maintenance cost guarantees available
- Metal being cut on first 2 development aircraft
- Launch orders imminent

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BAE SYSTEMS

## Honeywell AS900

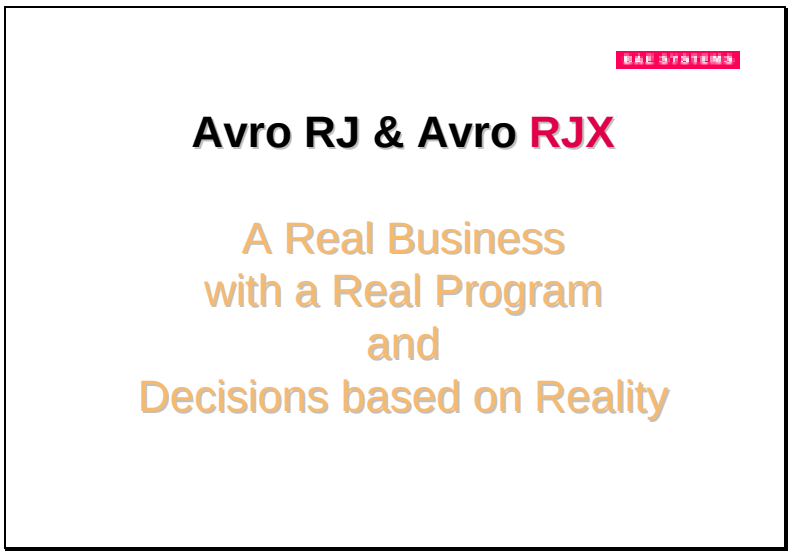
- First flight test Jan 2000

Achieved

- First engine run July 1999

Achieved

Slide 29


BAE SYSTEMS
Avro RJ & Avro RJX
A Real Business
with a Real Program
and
Decisions based on Reality

Slide 30

BAE SYSTEMS


**Avro RJX**